

**Asia at the  
Crossroads:  
Prioritising  
Conventional  
Farming or  
Sustainable  
Agriculture?**

EXECUTIVE SUMMARY



In June of 2012, representatives of over 140 nations are expected to take part in the “Rio+20 United Nations Conference on Sustainable Development”. The conference – scheduled 20 years after the first Rio conference saw an agreement that the United Nations must do something to address environmental degradation and global warming – is expected to focus heavily on the concept of the “green economy”. The “green economy” includes the idea that livelihoods, growth and environmental sustainability must go hand-in-hand in developing countries. While the concept itself may be laudable, it will be an unattainable ideal unless governments show a willingness to adopt a new development model – one based on human rights as opposed to profit for elites. A key example of the need for change – both in terms of the right to livelihood, environmental sustainability and the right to sufficient and nutritious food – is the agriculture sector. This paper seeks to address fundamental questions about the agriculture sector in Southeast Asia and China and to begin to sketch what a way forward – a way towards the “green economy” – may look like.

Countries in Asia have shown the world in recent years that massive reductions in poverty and hunger are indeed possible. Yet deep hunger persists: 568 million Asians are still currently classified as undernourished, accounting for well over half of all those living with hunger in the world. Hundreds of millions more lack essential micronutrients – so-called the ‘hidden hunger’.<sup>1</sup> Rising food prices across the region and world are deepening hunger for millions of farmers who are net buyers of food, while climate change threatens to plunge hundreds of millions more people into hunger in the coming decades.<sup>2</sup>

This report argues that Asian countries are at a crossroads in their agriculture strategies. Before them are two farming models: ‘conventional’, industrial farming, promoted by the Green Revolution; and sustainable, or ecological, agriculture – involving methods of farming that are gaining increasing acceptance around the world as the most viable way to promote food security and address climate change.

Based on secondary research and fieldwork among farmers in Cambodia, Myanmar, Thailand, Vietnam and the Guangxi Autonomous Region of China, we highlight the deep problems associated with conventional farming and argue that Asian countries must promote sustainable agriculture with much greater urgency than they are currently doing.

## Conventional Farming

Conventional farming – often also called industrial or high input agriculture – is strongly associated with the Green Revolution. This has sought to massively increase productivity through promoting ‘modern’ farming inputs – high-yielding seed varieties and hybrids (mainly of wheat and rice), chemical fertilisers and pesticides, and a big focus on irrigation. Conventional farming in Asia has also often prioritised producing crops for export markets and consolidated large areas of land for mono-cropping (the production of a single crop). Farmers have been encouraged to grow cash crops and to borrow money to invest in ‘high-tech’ inputs, thus increasing their costs of production, on the assumption that increased sales in local markets would be more than enough to repay their debts. Some observers regard the highpoint of the Green Revolution as running from 1965 to 1990; in fact, it remains the dominant model of agriculture promoted by governments and donors throughout the region.<sup>3</sup>

## Sustainable Agriculture

Sustainable agriculture – also often called ecological farming or alternative farming – is an approach derived from the recognition of people’s right to food. It is a way of life based on self-reliant and agro-ecological systems which promote the ability of smallholders and family farmers to gain access to and own their productive resources, such as land, water, forest and

seeds and to use these to secure their livelihood, with the support of socially, economically and environmentally appropriate methods and technologies. Sustainable agriculture refers to the ability of farms to produce nutritious food without damaging soils, ecosystems or human capital, and that reduces (or eliminates) reliance on external inputs such as chemical fertilisers and pesticides. It encompasses approaches such as agro-ecology, agro-forestry, low external input farming, organic agriculture, and water harvesting in dry land areas. It aims to integrate biological and nutrient processes such as nutrient cycling, nitrogen fixation and soil regeneration into food production processes.

## The Impacts of Conventional Farming

Conventional farming in Asia has had significant successes but also major adverse impacts in recent decades. Five areas stand out:

- **Yields have risen but are slowing.** Cereal production in Asia virtually doubled between 1970 and 1995 and, during 1980-2000, production per hectare rose by 60 per cent in China and 114 per cent in Vietnam.<sup>4</sup> Although cereal yields have continued to rise since the highpoint of the Green Revolution, annual growth rates have slowed. Rice yield growth in East Asia and Southeast Asia rose by 2.5 per cent a year on average during 1970-90, but slowed to 0.5 per cent and 1.5 per cent, respectively, during 1990-2004.<sup>5</sup> Much of this is

likely to be the result of the deteriorating water and soil quality produced in intensive mono-cropping systems. This trend suggests that the same high-input policies as pursued in the past will be unlikely to work in the future.

- **Poverty has fallen but is not being eliminated while inequalities are rising.** Conventional farming's success in expanding food production has helped to reduce poverty levels: in 1975, nearly 3 out of 5 Asians were living in poverty; this declined to less than 1 in 3 by 1995.<sup>6</sup> The per capita availability of calories in Asia increased by around 30 per cent during 1970-95.<sup>7</sup> However, the figure of 568 million hungry Asians testifies to the failure to eliminate poverty. Although conventional farming methods have increased yields in many agriculturally optimal areas, they have been less effective in marginalised, resource-poor areas where farmers have no access to modern inputs and technologies.<sup>8</sup> Inequalities between regions and farmers have increased under conventional farming: one analysis of 307 studies on the Green Revolution found that 40 per cent reported increased income inequalities.<sup>9</sup> Millions of farmers have also become heavily indebted due to taking out loans to buy expensive external inputs. Finally, Green Revolution policies do not fully explain Asian success in reducing poverty and hunger; other policies, notably land reform, have also been key.

- **Farmer and public health is being undermined.** The use of chemical pesticides has increased dramatically under conventional farming. Pesticides are responsible for millions of cases of poisoning a year and the contamination of groundwater; most Asian countries now suffer significant farmer and public health problems as a result of pesticide use. Asian governments have done little to regulate the pesticides trade, ensure farmers are adequately protected or train farmers on safe use. Farmers' health has also been adversely affected by the promotion of mono-cropping, which encourages farmers to grow cereals at the expense of other crops, leading to less diverse, nutritious diets for households and, more broadly, to relatively higher prices of crops with higher nutrition, meaning they are less easily purchased by the poor.<sup>10</sup>
- **Soils and the environment are being massively damaged.** During 1980-2000, chemical fertiliser use per hectare increased 11-fold in Vietnam, 6-fold in Thailand and nearly doubled in China.<sup>11</sup> Yet 30-80 per cent of nitrogen applied to farmland escapes to contaminate water systems and the atmosphere.<sup>12</sup> Chemical fertilisers and pesticides have contaminated water aquifers and waterways in Asia with nitrogen, phosphorous and highly toxic heavy metals.<sup>13</sup> In South and Southeast Asia, around 74 per cent of agricultural lands have been severely affected by erosion or chemical pollution.<sup>14</sup> The intensive withdrawal of water has also depleted aquifers, especially in China and

South Asia, and reduced the flow of major rivers.<sup>15</sup> Nearly 40 per cent of irrigated land in dry areas of Asia is affected by salinisation, which reduces crop productivity.<sup>16</sup>

- **Conventional farming is a major contributor to climate change**, responsible for around 60 per cent of nitrous oxide emissions (mainly from chemical fertiliser) and around 50 per cent of methane emissions (much of which comes from livestock). Further greenhouse gas emissions are caused by deforestation and forest burning. Asian agriculture is responsible for around 40 per cent of global agricultural emissions of greenhouse gases.<sup>17</sup> Chinese agriculture's use of nitrogen fertiliser accounts for 8 per cent of the country's total greenhouse gas emissions.<sup>18</sup>
- **The sustainability of smallholder farming is being eroded.** Although millions of smallholder farmers, especially in China and Vietnam, have improved their livelihoods in recent decades, conventional farming has eroded the long-term sustainability of millions of others in various ways – notably by promoting mono-cropping, hybrid seeds, genetically modified organisms (GMOs) and land grabs. In particular, mono-cropping has made farmers dependent on one or two crops, putting them at risk if market prices for those crops fall. It has also severely reduced biodiversity; more than 1,500 rice varieties were lost in Indonesia between 1975 and 1990, for example.

Together with high fertiliser use, mono-cropping has also often increased pest and disease problems since fertiliser often creates a dense, lush canopy in which pests can thrive. To combat this, farmers have often resorted to overuse of chemical pesticides which often kills natural predators leading to a resurgence of pest populations for which the solution is the application of still more chemical pesticides.<sup>19</sup>

### The advantages of sustainable agriculture

Sustainable agriculture uses fewer expensive external inputs and thus a major advantage to farmers is lower production costs and less indebtedness. At the same time, increasing evidence shows that sustainable agriculture can achieve yields equal to, or greater than, conventional farming. The largest study to date, led by Jules Pretty at the University of Essex in England, has been that of 286 projects whereby farmers in 57 countries were engaged in transitions to sustainable agricultural practices. It found that the average yield increase was around 79 per cent across a wide variety of systems and crop types.<sup>20</sup> Similarly, a 2007 study by the University of Michigan, comparing a global dataset of 293 examples of yields of organic versus conventional or low-intensive food production, concluded that organic farming methods could produce enough food to feed the world population on a per capita basis; it also found that leguminous cover crops could fix enough nitrogen to replace the amount of synthetic fertiliser currently in use.<sup>21</sup> Other studies suggest that the shift from

conventional to, for example, organic farming, can result in yield losses in the first two years, but that yields can be similar to those under conventional farming methods by the third year.<sup>22</sup>

Sustainable agriculture provides other advantages over conventional farming:

- Sustainable agriculture has a **minimum negative impact on the environment** and avoids contamination of soil and water resources. It promotes the reduction of waste and pollutants and discourages burning. It can also enhance soil fertility and water management by practices such as mulching or water harvesting, thus helping to maintain the safety of water sources in rural areas and has positive effects on soil drainage and water-holding capacity, with crop yields often higher in times of drought.<sup>23</sup>
- Sustainable agriculture can **mitigate climate change** by reducing dependence on fossil fuels and energy requirements, especially by reducing the use of nitrogen fertilisers. The FAO notes that organic agriculture reduces carbon dioxide emissions by 48-60 per cent<sup>24</sup> and energy requirements by 25-50 per cent<sup>25</sup> compared to conventional farming. Practices such as composting and agro-forestry also help to sequester carbon dioxide in soils and increase soil organic matter while the increased forestation and

vegetation promoted under sustainable agriculture helps mitigate carbon dioxide emissions.

- Sustainable agriculture **enhances resilience and diversity** and can play a key role in helping farmers adapt to climate crises. Many farmers, including women farmers who tend to be the poorest, are vulnerable to crises and have been made more so due to mono-cropping. Practices such as crop rotation and inter-cropping increase the availability of food throughout the year, increase diversity in food production and use seeds and breeds with higher tolerance to climate extremes and pests - these can reduce the risks of income losses associated with seasonal variations or crop failures, compared to conventional farming.<sup>26</sup> Sustainable agriculture promotes and protects agro-biodiversity, including traditional seed varieties, and promotes the use of crops that are adapted to local conditions which farmers can improve, breed and freely save and exchange.
- **Farmers' health can be improved** in a number of ways through sustainable agriculture, notably by promoting a more diversified diet through producing various food items, by using fewer pesticides, and by improving the availability of clean water.
- **Sustainable agriculture benefits women farmers** by promoting their access, control and ownership over

resources in the production, processing and distribution chain. Indeed, women farmers – who comprise the majority of the world’s farmers – can benefit most from sustainable agriculture, since it is they who often work in the most degraded farming areas, with lower incomes to buy expensive inputs and less access to credit and thus who have the most difficulty in accessing external inputs and subsidies.

### Positive sustainable agriculture impacts in Asia

In China, various sustainable agriculture practices have been successful, such as the ‘pig-biogas-fruit’ model – in which biogas slurry is used to fertilise fruit trees, reducing the need for nitrogen fertilisers - and the ‘rice-paddy-duck’ model - which raises fish, ducks and crabs in rice paddies, controls weeds and pests and reduces the need for chemical fertilisers.<sup>27</sup> ActionAid’s research in Sancha village in Guangxi Autonomous Region - where farmers began organic rice farming in 2005– found that 76 farming households make organic fertiliser from peanut residue, fish meal, bone meal and plant ashes, and that their rice output is the same as by using chemical fertiliser. As regards organic pesticides, the farmers raise ducks in paddy fields to help control weeds and insects, and use a homemade herb liquid and moth-killing lamps. This has led to reductions in pests such as the yellow rice borer, rice plant hopper and mosquitoes.

In Cambodia, a study of 57 farmers in 7 communities, all

practicing organic agriculture, found that farmers reported greater nutritional diversity, a higher level of food security, yield increases, improvements in health (mainly due to less use of pesticide), and increased incomes (mainly due to lower input costs).<sup>28</sup> Similarly, the Cambodian Organic Agriculture Association reports that conventional rice farmers achieved a nationwide average yield of 2.4 metric tonnes per hectare in the 2007/08 rainy season, whereas organic farmers obtained 3.5 metric tonnes.<sup>29</sup>

### Governments’ lagging policies

In the last decade or so, most governments in Asia have begun promoting some forms of sustainable agriculture, partly in recognition of the problems with conventional farming. But our analysis is that such initiatives are extremely limited. Asian governments are not making a decisive break with conventional farming and do not have national sustainable agriculture strategies in place.<sup>30</sup> Most governments spend almost nothing on research into organic agriculture, for example.<sup>31</sup> Although they have gone furthest in promoting organic agriculture, this is mainly to secure new export markets rather than to promote the food security of smallholder farmers or environmental concerns.

In 1994 the Chinese government published a White Paper promulgating ecological farming since when policy has promoted ‘eco-counties’ comprising several million hectares of land.<sup>32</sup> Yet the other side of the coin is that China remains a massive producer and user of chemical fertilisers and

pesticides, causing a huge environment toll, despite the fact that modelling suggests that nitrogen derived from organic fertilisers could completely replace chemical nitrogen fertilisers without affecting agricultural output.<sup>33</sup> Moreover, there is little government-funded agricultural research on organic farming methods and the local extension service plays a marginal role in supporting sustainable agriculture.<sup>34</sup>

### Recommendations to Asian governments

ActionAid calls on governments in Asia and the regional organisation, ASEAN, to prioritise sustainable agriculture in order to promote national and household food security, improve the livelihoods of smallholder women and men farmers and aid the process of adapting to climate change. Governments should:

- **Draw up national sustainable agriculture strategies.** These should outline:
  - How governments are going to prioritise supporting smallholder farmers, notably women, in promoting sustainable agriculture, what kind of support smallholder farmers are going to receive and how farmers themselves will be involved in policy design and implementation
  - The investments needed to promote these strategies, and plans for making the transition away from conventional farming.

- How farmers' own knowledge and creativity are going to be incorporated in the process of building sustainable alternatives.
- **Re-orient extension services and create 'knowledge hubs' to support smallholder farmers in promoting sustainable agriculture to maximise their food security and food production.** Governments need to increase spending on extension, improve training for extension staff and reach much large numbers of farmers. More well-trained women extension officers are needed to support women farmers. In particular, new extension services need to facilitate the process of building bridges between local and scientific knowledge that help local communities to innovate and reduce dependency on external inputs and which help design and implement site-specific, tailor-made sustainable production systems.
- **Transform agricultural research strategies to support sustainable agriculture.** This should include on-farm research on smallholder farmers' sustainable agriculture methods and developing publicly-bred and managed seed varieties resistant to droughts, floods and pests.
- **Phase out input subsidy schemes for agro-chemicals (fertiliser and pesticides) in favour of subsidy programmes to promote sustainable agriculture,** such as soil conservation and erosion

control, composting, green manure, biofertilisers, agro-forestry and incentives to eliminate burning.

- **Provide credit programmes at low-interest rates and long pay-back periods to help smallholder women and men farmers make the transition to sustainable agriculture**, for example by supporting the use of inputs and methods that are already available, to help farmers access other local, non-fossil organic farming inputs and to help them invest in marketing and processing.
- **Take greater steps to establish community banks of grain, seeds, biomass, fodder, storage or marketing facilities at local level.**
- **Promote extensive land reforms to increase the security of tenure of smallholder farmers and ensure that such laws apply equally, in practice as in law, to women farmers.**
- **Step up support for improved water management** and incentive practices that reduce water runoff and local water harvesting, such as community and on-farm small dams, cisterns to collect water from roofs,

underground dams and simple soil testing kits.

- **Implement or strengthen social assistance programmes such as food and cash transfers.** Guaranteed employment schemes could employ large numbers of people in forest conservation and integrated watershed development. School feeding programmes and public food distribution systems could procure food from smallholder farmers practicing sustainable agriculture.
- **Reduce the distance between producers and consumers, and increase access to markets** by: supporting the implementation of local processing units of smallholder farmers' products; investing in local infrastructure for transport and storage facilities; investing in local, regional and institutional markets for smallholder farmers' products; enhancing smallholder farmers' processing, business management and marketing skills by building the capacity of farmers groups; and building up women smallholders' confidence by helping them to gain new skills in marketing, business management and advocacy.

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